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Exercises in botany.⁵

THIS little book, the author states, is designed to supply the need of pupils under the supervision of a teacher who can devote but little time to the subject, and is planned so that the teacher, burdened with other duties, need have little to do in the way of preparing outlines of the daily work. It contains many suggestive facts and various interesting observations not found in similar books. The colloquial and figurative style, which the author adopts to a considerable extent, doubtless aids in holding attention, but seems, at least here and there, to be carried beyond permissible limits in a work devoted to scientific teaching, as, for instance, when it is stated that the embryo of the western peony "does not intend to carry its store of food above ground, . . . nor does it risk decapitation at the hands of Jack Frost." In some cases there is more or less obscurity, as in the question, "Which edge of an elm leaf is nearest the twig on which it grows?" And we are reminded of Grant Allen's "high priori" reasoning by the passage, "In short, an apple is good that its seeds may be distributed. A cherry is red that some cherry-loving animal may surely find it and drop its seed far from the parent tree."

On the whole, it may be doubted whether the book is likely to quite fulfill the author's purpose, and a careful examination strengthens the conviction that, however such books may be multiplied, the need of specially trained teachers is thereby increased rather than diminished. In the teacher's library, with others of its kind that are appearing at frequent intervals, it will serve a good purpose in suggesting observations and experiments.—V. M. S.

NOTES FOR STUDENTS.

PROFESSOR D. H. CAMPBELL,⁶ has recently investigated the morphology of *Naias* and *Zannichellia*. He has confirmed the views of previous observers as to the axial nature of the stamens and ovules, and the mutual relation of leaf, axis, and branch. The stamen of *N. flexilis* is interesting on account of its being surrounded by two envelopes, the inner of which Professor Campbell regards as the homologue of the ovular integument which it greatly resembles, and the outer as corresponding to the carpel of the "female flower." The origin and development of the sexual elements, the growth of the pollen tube, and fertilization do not depart materially from the usual angiospermous type.

The first division of the embryo is transverse, as usual, dividing it into a basal or "suspensor" cell and a terminal or "embryo" cell. The further development of the embryo agrees with Schaffner's account of *Alisma* as

⁵ RATTAN, VOLNEY.—Exercises in Botany for the Pacific States. The Whitaker & Ray Co., San Francisco. 1897.

⁶ Proc. Cal. Acad. Sci. 3d series 1: 1-62. *pl.* 5. 1897.